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Texas Agricultural Extension Service

Texas Citrus Diseases Affecting the Fruit

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Diseases that primarily affect citrus fruit are usually of most concern to handlers and shippers. Many, however, begin in the orchard and can be reduced if proper measures are taken. These measures include avoiding picking fruit while it is wet from rain or dew and using lined boxes and trailers to minimize damage to the surface of the fruit.

Small lesions may be caused by fingernails, sharp objects and minor bruises. These openings on the surface of the fruit, although unseen, make it possible for microorganisms to gain entrance into the fruit. Sanitation in the field and packing house also is of the utmost importance. Infection can be decreased by preventing fruit from coming in contact with the soil and keeping harvest bags, field boxes, trailers and trucks clean of debris. Most post-harvest diseases can be avoided if management and personnel are aware of the importance of keeping the fruit free of damage and contamination.

Many post-harvest diseases occur on citrus. Only a few of the most common diseases are discussed in this publication.

Melanose

Of all citrus fruits, grapefruit is affected the most by melanose. Control of this disease plays an important role in the Valley, particularly in the production of gift fruit, because the disease greatly affects the appearance of the fruit. Small, brown, raised spots are found on the fruit. Usually, numerous spots coalesce into a big area, resulting in the phase of the disease known as "mudcake melanose." At other times, "tearstains" are found on the fruit as the result of spores being washed down in water from dew or rain. Infection and disease development occur only in the orchard when the fruit is small. Therefore, no spread or contamination of other fruit occurs during processing and storage.

Mudcake or sandpaper symptoms of melanose on grapefruit.

Tearstaining caused by melanose spores washed down the fruit by dew or rain.

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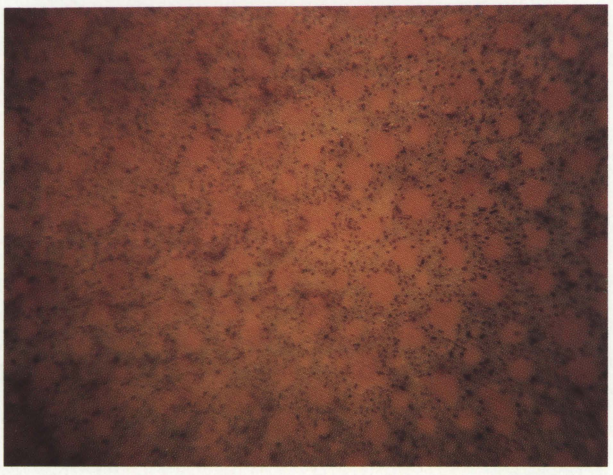
Greasy Spot

Although this disease is primarily a problem on leaves, the fungus also can infect the fruit. Infection occurs on cells surrounding pores, causing the fruit to become spotted or stippled. Areas surrounding these spots do not color properly because the cholorphyll present in the cells fails to disappear. If the spots are numerous, the fruit becomes unsightly, resulting in downgrading.



Fruit attacked by greasy spot fungus of guard cells of stomata; adjacent cells remain green longer than normal.

Flyspeck

The disease derives its name from the small black specks formed on the rind in areas immediately surrounding the oil glands. The fungus that causes this disease prevents infected spots from attaining the typical yellow color of mature citrus fruit. The contrast between green and yellow color lowers fruit grade, even though there is no effect on fruit or juice quality. Thus, it is of little consequence to fruit used for processing.

No effective economic program has been developed for the control of flyspeck. Tests with fungicide sprays in the summer have increased the percentage of clean fruit in some cases.

Rind-Oil Spot

Also known as oleocellosis, this disease has caused heavy losses to growers and shippers of Marrs and navel oranges picked early in the season with green rinds. It also may affect other citrus varieties. The spotting is caused by oil released from oil glands. The extruded oil kills rind cells, causing them to turn brown. The spots may vary from less than 0.5 inch in diameter to large, irregular areas involving much of the fruit's surface. The spots remain brown in contrast to the yellow color of the normal rind after degreening treatment. Fruits harvested wet are more seriously damaged by this disorder.

Fruit should be picked when the fruit surface is dry and should be handled carefully so that oil glands are not punctured or ruptured. Rind-oil spot can be prevented or reduced by: (1) picking fruit in afternoons of clear, sunny days, (2) deferring picking 2 or 3 days after a rain or an irrigation, (3) using fiberboard-lined field boxes or padded trailers and (4) having pickers use cotton gloves.

Brown Rot

This fruit disease is caused by the same species of *Phytophthora* that causes foot rot. The fungus can attack fruit on the tree during periods of excessive rains or during irrigation. Infection by the fungus results in decayed areas that are brown, firm and leathery. At first, the fungus cannot be observed on the fruit. Later, a white velvety growth appears on the surface of the fruit, accompanied by a strong fermenting odor. Because the fungus is commonly found in the soil, fruit low on trees often is infected by rain-splashed soil. Winds can spread the actively growing fungus to fruit in the upper tree. The fruit must be wet for some time before infection by the brown rot fungus occurs.

The best control for brown rot is sanitation during transit and in the packinghouse. Disinfecting the boxes is important; treatment with disinfectant solutions and refrigeration are effective for prevention.

Stem End Decay

This disease is caused by the fungus *Diplodia natalensis* and often is detected at the packinghouse or in transit. Decay occurs around the stem end and advances in streaks down the side of the fruit. There is no fungal growth on the surface of the fruit.

Decay is reduced by dipping the fruit in fungicide solutions before placement in degreening rooms.

Promptness in handling and shipping, as well as refrigeration during transit, help reduce losses caused by stem end decay.

Brown discoloration from stem end decay.

Green and Blue Molds

Green mold, the most important of these two post-harvest diseases, is caused by the fungus *Penicillium digitatum.* A rapid breakdown occurs in fruit punctured or bruised during harvesting and packing operations. The fungus enters the fruit through wounds. Therefore, the disease can occur on fruit on the tree, in the packinghouse, in transit, in storage and in the marketplace. A white mold is first seen growing on the peel. The mold later turns green because of the large number of green spores produced. Decayed fruit becomes soft and shrinks.

Green mold (left) and blue mold (right) cause soft decay of fruit, accompanied by heavy sporulation of casual organisms.

As its name implies, blue mold, caused by the fungus *Penicillium italicum,* differs from green mold by the bluer color of the powdery mass of spores that develops over the surface of the fruit. Conditions favoring the two diseases are similar. Both fungi grow best at a temperature of 75° F and their development is slowed by lower temperatures. Cooling citrus fruit during storage and shipping is an effective way to decrease damage.

Losses from green and blue molds also can be reduced by taking precautions at harvest and in transit not to injure the fruit and by treating the fruit in the packing shed with a fungicide solution.

Grapefruit Chilling Injury

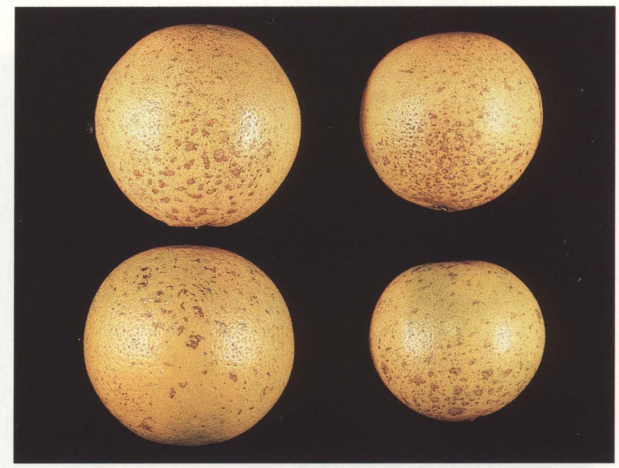
Most citrus fruit can be injured when exposed to low temperatures for extended periods of time even though these temperatures remain well over the freezing point. Grapefruit is more susceptible than oranges to damage caused by chilling temperatures. The symptoms are varied, consisting usually of irregular, superficial discoloration of the surface of the fruit and rind pitting. The size of the sunken lesions tends to be smaller and lesions are more numerous as the temperature nears 32° F.

Chilling injury to citrus fruit can be avoided by carefully selecting temperatures for citrus storage or transport. However, because rot and decay increase as the temperature increases, a proper balance must be maintained. Fruit must be picked at proper maturity and handled carefully both in the field and in the packinghouse to avoid chilling injury.

Chilling injury of citrus fruit.

Chemical Damage

Many chemicals are used in the production of citrus in South Texas. Herbicides, fungicides, insecticides and acaricides are needed to guarantee maximum production of marketable fruit. Although the proper application of these products will not result in damage to tree or fruit, sometimes mixing several products or applying these under certain atmospheric conditions will result in spotting, pitting or other damage to leaves and fruit. Because of the intensive agriculture practiced in the Valley, orchards often are located next to fields where other crops are grown. As a result, products that can be harmful to citrus, such as a cotton defoliant, sometimes are applied in close proximity. Care is needed in applying these products in the proper concentrations and avoiding weather conditions that could result in damage.



Chemical damage to fruit may resemble symptoms of parasitic diseases.

Acknowledgement

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